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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION of

VOGEL *ET AL.*

Group Art Unit: 1754

Application Serial No.: 09/645,554

Examiner: HENDRICKSON, S.L.

Filed: August 25, 2000

Title: FURNACE CARBON BLACK, PROCESS FOR PRODUCTION AND USE THEREOF

* * * * *

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Peter Albers, declare and state as follows:

1. I have extensive expertise in the technical application of the inelastic neutron scattering (INS) technique, especially in the field of carbon blacks and other carbons. Please see the attached *curriculum vitae* for my degrees and qualifications.
2. I am an inventor of the subject matter claimed in the U.S. Patent Application Serial No. 09/645,554, filed at the United States Patent and Trademark Office on August 25, 2000.
3. I am aware of, and understand, the rejection of claim 1 under 35 U.S.C. §102(e) as allegedly being anticipated by, or under 35 U.S.C. §103(a) as allegedly being obvious over, Gerspacher (U.S. Pat. No. 6,277,350) and of claim 6 under 35 U.S.C. §103(a) as allegedly being unpatentable over Gerspacher in view of Rositani *et al.* (*Carbon* 25, 325 - 332, 1987).
4. Claim 1 is directed to a furnace carbon black, having a hydrogen content of greater than 4200 ppm, determined by CHN analysis, and a peak integral ratio, determined by inelastic neutron scattering, of non-conjugated hydrogen atoms (1250 cm^{-1} – 2000 cm^{-1}) to aromatic and graphitic hydrogen atoms (1000 cm^{-1} – 1250 cm^{-1} and 750 cm^{-1} – 1000 cm^{-1}) of from 1.17 to 1.22.

Inventors: VOGEL *et al.*

Application No.: 09/645,554

Attorney Docket No.: 021123-0271649

5. Claim 6 is directed to an electrocatalyst comprising a furnace carbon black, having a hydrogen content of greater than 4200 ppm, determined by CHN analysis, and a peak integral ratio, determined by inelastic neutron scattering, of non-conjugated hydrogen atoms (1250 cm^{-1} – 2000 cm^{-1}) to aromatic and graphitic hydrogen atoms (1000 cm^{-1} – 1250 cm^{-1} and 750 cm^{-1} – 1000 cm^{-1}) of less than 1.22, wherein the furnace black is the support material for the electrocatalyst.
6. A limitation in both claims is the determination of a peak integral ratio of non-conjugated hydrogen atoms (1250 cm^{-1} – 2000 cm^{-1}) to aromatic and graphitic hydrogen atoms (1000 cm^{-1} – 1250 cm^{-1} and 750 cm^{-1} – 1000 cm^{-1}). This ratio is determined by the INS technique.
7. The INS technique consists of irradiating a specially designed thin-wall aluminum vessel containing the carbon black particles. The sample is irradiated with a pulsed neutron beam to obtain an inelastic neutron spectrum. The spectrum describes an amplitude-weighted phonon density of states. Phonons are the vibrational modes that are measured by the INS technique.
8. One benefit of the INS technique is that the aluminum container and the carbon of the carbon blacks are largely transparent to the pulsed neutron beam. On the other hand, the hydrogen atoms of the carbon black particles scatter the neutrons. Therefore this technique permits the measurement of the number and type (*i.e.*, non-conjugated, aromatic, and graphitic) of hydrogen atoms in the sample.
9. Another significant benefit of the INS technique is that it measures the type of hydrogen atoms in the sample as well as throughout a carbon black particle in the bulk sample. In other words, the ratio of non-conjugated to aromatic and graphitic hydrogen atoms obtained by the INS technique is not only on the surface of a carbon black particle but also in the interior of a carbon black particle.
10. In the present invention, the ratio of non-conjugated to aromatic and graphitic hydrogen atoms was measured by the INS technique, as indicated in claims 1

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and 6. Therefore, the ratio obtained is of the entire carbon black particle. In contrast, the carbon blacks of Gerspacher have a ratio of sp^3 to sp^2 hydrogens only on the surface of each particle. As a consequence, the carbon blacks of the present invention are different from those of Gerspacher.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

By:



Dr. Peter Albers

Date:

26.9.2003